INSTITUTE DATA

FORUM PARTICIPANT

J. Kenneth Richardson

INSTITUTE NAME

National Fire Laboratory

INSTITUTE AFFILIATIONS

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ENTRY DATE

September 1994

STAFF NUMBERS

35

FUNDING

$3.5M Annual 60% Federal Government 40% Other Sources

CAPABILITY STATEMENT

STRATEGIC OBJECTIVES OF RESEARCH

I. Provide the National Building Code of Canada and other North American codes with fire risk evaluation methodologies to enable performance-based fire safety regulations to be used.

CAPABILITY AREAS

I. Fire Resistance, including structural and fire barriers
II. Fire Suppression, including water mist and halon alternatives
III. Fire Risk Assessment Modelling
IV. Smoke Movement and Control

SPECIAL FACILITIES

I. Full-scale/full load column fire resistance furnace
II. 10-storey tower for evaluating smoke movement in high-rise buildings
III. 55 m by 30 m by 13 m high Burn Hall facility with no internal walls or columns
IV. 10 m high facility for full-scale investigations of fire spread on external walls
V. A full-scale (2.8 m wide by 3.6 m high) radiant panel facility including capabilities to measure mass loss rate and heat release rates
VI. Analytical chemistry facilities including GC/MS and MS/MS spectrometers for analyzing fire gases

RESEARCH PROGRAM

RESEARCH PROJECTS (Titles and Objectives)

Fire Control

I.To develop innovative technologies for supporting the building structure under sustained fire attack and develop engineering models for use in industry design guides, codes and FIRECAM (Fire Risk Evaluation and Cost Assessment Model).

II.To develop generic construction assemblies which meet fire safety parameters for interior and exterior fire resistance and develop engineering models for use in industry design guides and codes.

III.To develop and establish performance criteria and technologies for high-efficiency water-based fire suppression systems.

Fire Risk Assessment

I.To provide mechanisms that will lower building construction costs without lowering the level of fire safety in the form of computer models that will assess fire risks and fire costs in buildings.

II.To provide a sound technical basis for performance-based building

RECENT RESEARCH HIGHLIGHTS

I.As part of a joint research project with the National Association of Forest Industries Ltd. of Australia, the fire risk-cost assessment computer program, FIRECAM, was developed and applied during the past 3 years to three-storey timber-framed apartment buildings in Australia. The results show that 3-storey timber-framed apartment buildings with proper fire protection can provide same level of safety for the occupants as masonry buildings.

II.As part of a joint research project with the Public Works and Government Services Canada (PWGSC), FIRECAM was developed during the past 4 years for application to PWGSC highrise office buildings to obtain cost-effective renovations and retrofits. The Beta version of the program was transferred to PWGSC for Beta testing and case studies during 1994-1995.

III.As part of a joint research project with Canadian industry partners and the IRC Acoustics Lab, the effect of insulation on sound transmission classification (STC) and fire performance of gypsum board protected wall assemblies were investigated. The results were used to determine STC and fire ratings for generic wall assemblies

COLLABORATION

INTERNATIONAL LINKS

I. Cooperative Agreement with V.U.T, Melbourne, Australia on risk assessment
II. Collaborative research on smoke control and sprinklers with ASHRAE

RESEARCH OVERLAP WITH OTHER FORUM PARTICIPANTS

I. Fire resistance with VTT and others
II. Risk assessment modelling with FRS (UK) and others

POTENTIAL COLLABORATION THROUGH FORUM

I. High-rise smoke movement and control
II. Water based extinguishing systems
III. Fire growth modelling
IV. Risk assessment modelling

KEY RESEARCH STAFF
(OPTIONAL)

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RECENT PUBLICATIONS

Hadjisophocleous, G.V.; Kim, A.K.; Knill, K. "Modelling of a fi ne waterspray nozzle and liquid pool fire suppression", International Conference on Fire Research an d Engineering, Orlando, FL, USA, 1995, pp. 1-6.

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Sultan, M.A."Effect of insulation in the wall cavity on the fire resistance rating of full-scale asymmetrical (1x2)gypsum board protected wall ssem blies", Proceedings, International Confer ence on Fire Research and Engineering, Orlando, FL, USA, 1995.

Sultan, M.A. "The effect of gypsum board density and glass fibre in gypsum board core on the fire resistance of lightweight frame wall assemblies", Proceedings, 4th International Fire and Materials Conference, Washington, DC, USA, 1995.

Sumathipala, K.; Lougheed, G.D. "Results of radiant panel tests to measure burning characteristics of selected surfaces", Proceedings, Vision '95 - Society of Fir e Protection Engineers, Engineering Seminars, Denver, CO, USA, 1995, pp. 1-6.

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Yung, D.; Hadjisophocleous, G.V. "Risk and economy", Proceedings of the Majo r Industrial Accidents Council of Canada International Conference, Toronto, Ontario, Oct. 31-Nov. 3, 1995, pp. 495-506.